IN THE CLAIMS

1-94. (Cancelled)

95. (Previously presented) A method of detecting the presence of an ion, comprising:

(a) contacting a nucleic acid enzyme, wherein the enzyme is dependent on the ion to produce a product from a substrate, with a sample suspected of containing the ion; and

(b) measuring an amount of the product produced;

wherein the ion is in the presence of other ions, and the ion is Pb^{2+}; and

wherein the substrate comprises a fluorophore and the enzyme comprises a quencher of the fluorophore, or the enzyme comprises a fluorophore and the substrate comprises a quencher of the fluorophore.

96. (Previously presented) The method of claim 95, wherein the nucleic acid enzyme comprises a ribozyme.

97. (Previously presented) The method of claim 95, wherein the nucleic acid enzyme comprises a deoxyribozyme.

98. (Previously presented) The method of claim 95, wherein the nucleic acid enzyme and the substrate comprise separate nucleic acid strands.

99. (Previously presented) The method of claim 98, wherein a 5'-end of the substrate comprises the fluorophore.

100. (Previously presented) The method of claim 98, wherein a 3'-end of the enzyme comprises the quencher for the fluorophore.

101. (Previously presented) The method of claim 98, wherein the fluorophore is TAMRA.

102. (Previously presented) The method of claim 101, wherein the quencher is DABCYL.

103. (Previously presented) The method of claim 98, wherein the enzyme is linked to a support.

104. (Previously presented) The method of claim 98, wherein the substrate comprises at least one ribonucleotide.

105. (Previously presented) The method of claim 98, wherein the substrate comprises the nucleic acid sequence of SEQ ID NO:2.

106. (Previously presented) The method of claim 98, wherein the enzyme comprises the nucleic-acid sequence of SEQ ID NO:1.

107. (Previously presented) The method of claim 97, wherein the deoxyribozyme comprises a single strand.

108. (Previously presented) The method of claim 107, wherein the single strand comprises the fluorophore.

109. (Previously presented) The method of claim 108, wherein the single strand further comprises the quencher for the fluorophore.

110. (Previously presented) The method of claim 107, wherein the single strand comprises the nucleic acid sequence of SEQ ID NO:1.

111. (Previously presented) The method of claim 110, wherein the single strand further comprises the nucleic acid sequence of SEQ ID NO: 2.

112. (Previously presented) The method of claim 95, wherein the product comprises a nucleic acid.

113. (Previously presented) The method of claim 112, wherein the nucleic acid comprises the fluorophore.

114. (Previously presented) The method of claim 112, wherein the nucleic acid comprises the fluorophore quencher.

115. (Previously presented) The method of claim 95, wherein the sample suspected of containing the ion comprises a water sample.

116. (Previously presented) The method of claim 95, wherein the sample suspected of containing the ion comprises a bodily fluid.

117. (Previously presented) The method of claim 116, wherein the bodily fluid is blood.

118. (Previously presented) The method of claim 95, wherein the measuring comprises a measurement of fluorescence.

119. (Previously presented) The method of claim 118, wherein the measurement of fluorescence is selected from the group consisting of fluorescence intensity, fluorescence lifetime, and anisotropy.

120. (Previously presented) The method of claim 119, wherein an increase in fluorescence is indicative of the presence of the ion.

121. (Previously presented) The method of claim 95, wherein an array of nucleic acid enzymes comprises the nucleic acid enzyme.

122. (Previously presented) The method of claim 95, further comprising:

(c) comparing the measurement obtained in (b) with that of a standard curve created using known concentrations of the ion.

123. (Previously presented) The method of claim 122, wherein the nucleic acid enzyme comprises a ribozyme.

124. (Previously presented) The method of claim 122, wherein the nucleic acid enzyme comprises a deoxyribozyme.

125. (Previously presented) The method of claim 122, wherein the nucleic acid enzyme and the substrate comprise separate nucleic acid strands.

126. (Previously presented) The method of claim 125, wherein a 5'-end of the substrate comprises the fluorophore.

127. (Previously presented) The method of claim 126, wherein a 3'-end of the enzyme comprises the quencher for the fluorophore.

128. (Previously presented) The method of claim 125, wherein the fluorophore is TAMRA.

129. (Previously presented) The method of claim 128, wherein the quencher is DABCYL.

130. (Previously presented) The method of claim 125, wherein the enzyme is linked to a support.

131. (Previously presented) The method of claim 125, wherein the substrate comprises the nucleic acid sequence of SEQ ID NO:2.

132. (Previously presented) The method of claim 125, wherein the enzyme comprises the nucleic acid sequence of SEQ ID NO:1.

133. (Previously presented) The method of claim 124, wherein the deoxyribozyme comprises a single strand.

134. (Previously presented) The method of claim 133, wherein the single strand comprises the fluorophore.

135. (Previously presented) The method of claim 122, wherein the product comprises a nucleic acid.

136. (Previously presented) The method of claim 135, wherein the nucleic acid comprises the fluorophore.

137. (Previously presented) The method of claim 135, wherein the nucleic acid comprises the fluorophore quencher.

138. (Previously presented) The method of claim 122, the sample suspected of containing the ion comprises a water sample.

139. (Previously presented) The method of claim 122, wherein the sample suspected of containing the ion comprises a bodily fluid.

140. (New) A method of detecting the presence of an ion, comprising:

(a) contacting a nucleic acid enzyme, wherein the enzyme is dependent on the ion to produce a product from a substrate, with a sample suspected of containing the ion; and

(b) measuring an amount of the product produced;

wherein the ion is in the presence of other ions, and the ion is Pb^{2+};

the substrate comprises a fluorophore and the enzyme comprises a quencher of the fluorophore, or the enzyme comprises a fluorophore and the substrate comprises a quencher of the fluorophore;

the nucleic acid enzyme comprises a deoxyribozyme;

the nucleic acid enzyme and the substrate comprise separate nucleic acid strands; and

the measuring comprises a measurement of fluorescence.

141. (New) The method of claim 140, wherein the substrate comprises at least one ribonucleotide.

142. (New) The method of claim 140, wherein the sample suspected of containing the ion comprises a water sample.

143. (New) The method of claim 140, wherein the sample suspected of containing the ion comprises a bodily fluid.

144. (New) The method of claim 140, wherein the measurement of fluorescence is by anisotropy.

145. (New) The method of claim 140, further comprising:

(c) comparing the measurement obtained in (b) with that of a standard curve created using known concentrations of the ion.

146. (New) The method of claim 140, further comprising producing the sample by dissolving a solid.

147. (New) The method of claim 146, wherein the solid comprises paint.

148. (New) The method of claim 146, wherein the solid comprises soil.

149. (New) The method of claim 140, wherein the selectivity for Pb^{2+} is greater than 80 fold over other divalent metal ions.

150. (New) The method of claim 145, wherein the substrate comprises at least one ribonucleotide.

151. (New) The method of claim 145, wherein the sample suspected of containing the ion comprises a water sample.

152. (New) The method of claim 145, wherein the sample suspected of containing the ion comprises a bodily fluid.

153. (New) The method of claim 145, wherein the measurement of fluorescence is by anisotropy.

154. (New) The method of claim 145, further comprising producing the sample by dissolving a solid.

155. (New) The method of claim 154, wherein the solid comprises paint.

156. (New) The method of claim 154, wherein the solid comprises soil.

157. (New) The method of claim 145, wherein the selectivity for Pb^{2+} is greater than 80 fold over other divalent metal ions.

158. (New) The method of claim 146, wherein the substrate comprises at least one ribonucleotide.

159. (New) The method of claim 146, wherein the sample suspected of containing the ion comprises a water sample.

160. (New) The method of claim 146, wherein the sample suspected of containing the ion comprises a bodily fluid.

161. (New) The method of claim 146, wherein the measurement of fluorescence is by anisotropy.

162. (New) The method of claim 146, wherein the selectivity for Pb^{2+} is greater than 80 fold over other divalent metal ions.

163. (New) The method of claim 149, wherein the substrate comprises at least one ribonucleotide.

164. (New) The method of claim 149, wherein the sample suspected of containing the ion comprises a water sample.

165. (New) The method of claim 149, wherein the sample suspected of containing the ion comprises a bodily fluid.

166. (New) The method of claim 149, wherein the measurement of fluorescence is by anisotropy.

167. (New) The method of claim 154, wherein the selectivity for Pb^{2+} is greater than 80 fold over other divalent metal ions.

168. (New) The method of claim 167, wherein the substrate comprises at least one ribonucleotide.

169. (New) The method of claim 167, wherein the measurement of fluorescence is by anisotropy.